

WHAT IS CLAIMED IS:

1. A display apparatus having an optical material between a pair of substrates, and having a plurality of display pixel sections,

5       wherein each of the substrates has a glass substrate and a film that is attached to an outer surface of the glass substrate and has a thickness greater than a thickness of the glass substrate,

10      at least one of the films is formed of a polarizer plate, and

each of the glass substrate is formed to have a thickness that permits bending of the display apparatus.

2. The display apparatus according to claim 1,  
15      wherein the thickness of each of the glass substrates is 0.15 mm or less.

3. The display apparatus according to claim 2,  
wherein the display apparatus is formed to be bendable  
with a radius of curvature of 200 mm or less.

20      4. The display apparatus according to claim 1,  
wherein the optical material is a liquid crystal composition.

25      5. The display apparatus according to claim 1,  
wherein the optical material is an EL (electro-luminescence) material.

6. The display apparatus according to claim 1,  
wherein the display apparatus includes a spacer that is

disposed between the pair of substrates, the spacer being fixed on at least one of the substrates.

7. The display apparatus according to claim 1, wherein each of the display pixel section includes  
5 a TFT (thin film transistor) and a pixel electrode, which are formed on one of the glass substrates.

8. The display apparatus according to claim 7, wherein the TFT includes a p-Si film (polysilicon film).

10 9. A display apparatus having a plurality of display pixel sections on one of major surfaces of a substrate,

wherein the substrate has a glass substrate and a polarizer plate that is disposed to extend to an end part of the glass substrate on the other major surface of the substrate, and has a thickness greater than 15 a thickness of the glass substrate, and

the glass substrate is formed to have a thickness that permits bending of the display apparatus.

20 10. The display apparatus according to claim 9, wherein the thickness of the glass substrate is 0.15 mm or less.

11. The display apparatus according to claim 10, wherein the display apparatus is formed to be bendable 25 with a radius of curvature of 200 mm or less.

12. The display apparatus according to claim 10, wherein the thickness of the polarizer plate is 0.5 mm

or less.

13. The display apparatus according to claim 9,  
wherein the display pixel section includes a switch  
element near an intersection of a signal line and  
5 a scan line that are disposed to be substantially  
perpendicular to each other on the glass substrate, and  
the switch element is composed of a thin film  
transistor including a polysilicon film.

14. The display apparatus according to claim 13,  
10 wherein the display apparatus includes:

a signal line drive circuit that supplies a drive  
signal to the signal line; and

a scan line drive circuit that supplies a drive  
signal to the scan line, and

15 the signal line drive circuit and the scan line  
drive circuit are provided on the glass substrate.

16. The display apparatus according to claim 14,  
wherein the signal line drive circuit and the scan line  
drive circuit are composed of thin film transistors  
20 each including a polysilicon film.

17. A method of manufacturing a display apparatus  
having an optical material between a pair of glass  
substrates comprising:

25 (a) a step of attaching the pair of glass  
substrates together with a predetermined distance;

(b) polishing an outer surface of each of the  
glass substrates to a thickness of 0.15 mm or less;

(c) attaching a film to the outer surface of at least one of the glass substrates, the film having a thickness greater than a thickness of the glass substrate; and

5 (d) cutting the film and the pair of glass substrates into a predetermined size.

17. The method of manufacturing a display apparatus, according to claim 16, further comprising, prior to the attaching step, a step of dropping 10 a liquid crystal composition on one of the glass substrates.

18. The method of manufacturing a display apparatus, according to claim 16, further comprising, following the cutting step, a step of connecting the 15 glass substrate, on which the film is not attached, to an external electrode terminal.

19. The method of manufacturing a display apparatus, according to claim 18, further comprising, following the connecting step, a step of attaching 20 another film on the glass substrate.

20. A display apparatus comprising:

a display panel configured to hold a liquid crystal layer between an array substrate and a counter substrate; and

25 a backlight unit that illuminates the display panel,

wherein the array substrate includes:

a first light-transmissive insulation substrate;  
a signal line and a scan line that are disposed to  
be substantially perpendicular to each other on one of  
major surfaces of the first light-transmissive  
5 insulation substrate;

a switch element disposed near an intersection of  
the signal line and the scan line; and

a pixel electrode connected to the switch element,  
the counter substrate includes:

10 a second light-transmissive insulation substrate;  
and

a counter electrode disposed on one of major  
surfaces of the second light-transmissive insulation  
substrate so as to face the pixel electrode, and

15 polarizer plates are disposed respectively on the  
other major surfaces of the first light-transmissive  
insulation substrate and the second light-transmissive  
insulation substrate, the polarizer plates having  
thicknesses greater than those of the first light-  
transmissive insulation substrate and the second  
20 light-transmissive insulation substrate.

21. A display apparatus comprising a display panel  
configured to hold a liquid crystal layer between  
an array substrate and a counter substrate,

25 wherein the array substrate includes:  
a first insulation substrate;  
a signal line and a scan line that are disposed to

be substantially perpendicular to each other on one of major surfaces of the first insulation substrate;

a switch element disposed near an intersection of the signal line and the scan line; and

5           a reflective electrode connected to the switch element,

the counter substrate includes:

a second insulation substrate; and

10          a counter electrode disposed on one of major surfaces of the second insulation substrate so as to face the reflective electrode, and

15          a polarizer plate is disposed on the other major surface of the second insulation substrate, the polarizer plate having a thickness greater than a thickness of the second insulation substrate.

22. A display apparatus with a plurality of display pixel sections, comprising:

an insulation substrate;

20          a polarizer plate attached to the insulation substrate; and

              a touch panel that is attached to the polarizer plate and generates an input signal by sensing a position within a predetermined region.

23. A display apparatus comprising:

25          a first insulation substrate;

              a plurality of display pixel sections provided on one of major surfaces of the first insulation

substrate;

a second insulation substrate that is disposed to face the display pixel sections of the first insulation substrate;

5 a polarizer plate that is attached to one of major surfaces of the second insulation substrate, which is opposite to the major surface that faces the display pixel sections; and

10 a touch panel that is attached to the polarizer plate and generates an input signal by sensing a position within a predetermined region.

24. The display apparatus according to claim 22 or 23, wherein the polarizer plate has a thickness greater than a thickness of the insulation substrate.

15 25. The display apparatus according to claim 22 or 23, wherein the touch panel comprises:

20 a first substrate including a first conductor layer disposed in the predetermined region and a pair of first detection electrodes disposed on opposed two sides of the first conductor layer;

25 a second substrate including a second conductor layer disposed in the predetermined region and a pair of second detection electrodes disposed on opposed two sides of the second conductor layer, which are perpendicular to the first detection electrodes; and

holding means for holding the first substrate and the second substrate with a predetermined distance, and

the first electrode is attached to the polarizer plate.

26. The display apparatus according to claim 22 or 23, wherein the display pixel section includes  
5 a display medium between a pair of electrodes.

27. The display apparatus according to claim 26,  
wherein the display pixel section includes a switch element near an intersection of a signal line and  
10 a scan line that are disposed to be substantially perpendicular to each other on the insulation substrate, and

the switch element is composed of a thin film transistor including a polysilicon film.

28. The display apparatus according to claim 27,  
15 wherein the display apparatus includes:

a signal line drive circuit that supplies a drive signal to the signal line; and

a scan line drive circuit that supplies a drive signal to the scan line, and

20 the signal line drive circuit and the scan line drive circuit are provided on the insulation substrate.

29. The display apparatus according to claim 28,  
wherein the signal line drive circuit and the scan line drive circuit are composed of thin film transistors  
25 each including a polysilicon film.

30. The display apparatus according to claim 26,  
further comprising a columnar spacer that creates

a predetermined gap between the pair of electrodes of the display pixel section.

31. The display apparatus according to claim 22 or 23, wherein the insulation substrate on which the polarizer plate is disposed has a thickness of 0.15 mm or less.

32. A display apparatus comprising:  
a display panel configured to hold a liquid crystal layer between an array substrate and a counter substrate;

10 a backlight unit that illuminates the display panel; and

a touch panel that generates an input signal by sensing a position within a predetermined region,

15 wherein the array substrate includes:

a first light-transmissive insulation substrate;

a signal line and a scan line that are disposed to be substantially perpendicular to each other on one of major surfaces of the first light-transmissive insulation substrate;

a switch element disposed near an intersection of the signal line and the scan line; and

a pixel electrode connected to the switch element,

the counter substrate includes:

20 a second light-transmissive insulation substrate;  
and

a counter electrode disposed on one of major

surfaces of the second light-transmissive insulation substrate so as to face the pixel electrode,

5        polarizer plates are disposed respectively on the other major surfaces of the first light-transmissive insulation substrate and the second light-transmissive insulation substrate, and

the touch panel is attached to the polarizer plate on the second light-transmissive insulation substrate side.

10      33. A display apparatus comprising:

a display panel configured to hold a liquid crystal layer between an array substrate and a counter substrate; and

15      a touch panel that generates an input signal by sensing a position within a predetermined region,

wherein the array substrate includes:

a first light-transmissive insulation substrate;  
a signal line and a scan line that are disposed to be substantially perpendicular to each other on one of  
20      major surfaces of the first light-transmissive insulation substrate;

a switch element disposed near an intersection of the signal line and the scan line; and

a pixel electrode connected to the switch element,

25      the counter substrate includes:

a second light-transmissive insulation substrate;

and

a counter electrode disposed on one of major surfaces of the second light-transmissive insulation substrate so as to face the pixel electrode,

5 a polarizer plate is disposed on the other major surface of the second light-transmissive insulation substrate, and

the touch panel is attached to the polarizer plate.

34. A display apparatus with a plurality of  
10 display pixel sections, comprising:

an insulation substrate;

a touch panel that is attached to the insulation substrate and generates an input signal by sensing a position within a predetermined region; and

15 a polarizer plate attached to the touch panel.

35. A display apparatus with a plurality of display pixel sections, comprising:

an insulation substrate;

20 a polarizer plate attached to the insulation substrate; and

a backlight unit that is attached to the polarizer plate and illuminates the display pixel sections.

36. A display apparatus comprising:

an insulation substrate;

25 a plurality of display pixel sections provided on one of major surfaces of the insulation substrate;

a polarizer plate attached to the other major

surface of the insulation substrate; and  
a backlight unit that is attached to the polarizer  
plate and illuminates the display pixel sections.

37. The display apparatus according to claim 35 or  
5 36, wherein the polarizer plate has a thickness greater  
than a thickness of the insulation substrate.

38. The display apparatus according to claim 35 or  
10 36, wherein the backlight unit includes a light source  
section and an optical sheet that imparts predetermined  
optical characteristics to light emitted from the light  
source section, and

the optical sheet is attached to the polarizer  
plate.

39. The display apparatus according to claim 35 or  
15 36, wherein the backlight unit includes a planar light  
source section, and the planar light source section is  
attached to the polarizer plate.

40. The display apparatus according to claim 35 or  
36, wherein the display pixel section includes a  
20 display medium between a pair of electrodes.

41. The display apparatus according to claim 40,  
wherein the display pixel section includes a switch  
element near an intersection of a signal line and  
a scan line that are disposed to be substantially  
25 perpendicular to each other on the insulation  
substrate, and

the switch element is composed of a thin film

transistor including a polysilicon film.

42. The display apparatus according to claim 41,  
wherein the display apparatus includes:

a signal line drive circuit that supplies a drive  
signal to the signal line; and

a scan line drive circuit that supplies a drive  
signal to the scan line, and

the signal line drive circuit and the scan line  
drive circuit are provided on the insulation substrate.

10 43. The display apparatus according to claim 42,  
wherein the signal line drive circuit and the scan line  
drive circuit are composed of thin film transistors  
each including a polysilicon film.

15 44. The display apparatus according to claim 40,  
further comprising a columnar spacer that creates  
a predetermined gap between the pair of electrodes of  
the display pixel section.

45. The display apparatus according to claim 35 or  
36, wherein the insulation substrate on which the  
20 polarizer plate is disposed has a thickness of 0.15 mm  
or less.

46. A display apparatus comprising:

a display panel configured to hold a liquid  
crystal layer between an array substrate and a counter  
25 substrate; and

a backlight unit that illuminates the display  
panel,

wherein the array substrate includes:

a first light-transmissive insulation substrate;

a signal line and a scan line that are disposed to be substantially perpendicular to each other on one of  
5 major surfaces of the first light-transmissive insulation substrate;

a switch element disposed near an intersection of the signal line and the scan line; and

a pixel electrode connected to the switch element,

10 the counter substrate includes:

a second light-transmissive insulation substrate;

and

a counter electrode disposed on one of major surfaces of the second light-transmissive insulation 15 substrate so as to face the pixel electrode,

polarizer plates are disposed respectively on the other major surfaces of the first light-transmissive insulation substrate and the second light-transmissive insulation substrate, and

20 the backlight unit is attached to the polarizer plate on the first light-transmissive insulation substrate side.